COST ANALYSIS FOR THE PROPOSED CONDITIONAL WAIVER FOR DISCHARGES FROM IRRIGATED LANDS

I. INTRODUCTION

This cost analysis provides Regional Board staff's estimate of costs associated with the Conditional Waiver program. The key elements of this cost analysis include costs for the monitoring and reporting program (MRP) required by the Conditional Waiver and costs for best management practices (BMPs) implementation. The analysis also addresses the potential for cost offsets through State Board programs and compares monitoring costs for the Los Angeles region to the monitoring costs of Conditional Waivers in the Central Coast and Central Valley Regions. Significant uncertainties in several key areas of the waiver program prevent the precise estimation of program costs, including: the number of discharger groups that growers will form, the total number of monitoring sites that will be required to evaluate exceedances of benchmarks, the nature and extent of BMPs that will be required to address those exceedances, and the availability of federal, state, and local funding to offset monitoring and BMP implementation costs. These uncertainties, as well as the basis for staff's cost estimates, are identified in the analysis.

The cost analysis is organized according to the following headings:

The goal of this cost analysis is to address several concerns of the Regional Board at the Public Workshop on March 3, 2005. At the workshop, the Regional Board directed staff to address the program costs more comprehensively and to identify more clearly the program uncertainties and the basis for staff's estimate. To address Regional Board concerns, Board staff contacted interested parties who commented on the Cost Analysis to request and incorporate their information and consulted with Regional Board staff in the Central Coast and Central Valley Regions to review the factors and methods of Staff's cost analysis.

II. ESTIMATED COST FOR MONITORING AND REPORTING PROGRAM

Regional Board staff has analyzed the costs associated with the Monitoring and Reporting Programs (MRPs) required by the Conditional Waiver for Discharges from Irrigated Lands, both for Individual Dischargers and for Discharger Groups. This analysis includes cost estimates for sampling the required constituents of concern (COC), analyzing the samples, and reporting the results of the sampling analysis.

A. Monitoring

The Conditional Waiver includes four monitoring years, divided into two periods of two years each for both Individual and Group Dischargers. The first monitoring period will begin one year after submittal of the NOI, and will continue for two years. The second monitoring period will begin after the end of the first period, and will continue for two years, until the expiration of the Conditional Waiver. During the first monitoring period, four sampling events per year are required (one sample during the first storm of the wet season, a second wet season storm sample, and 2 dry season samples), except for Toxicity, which only needs to be sampled once per year during the dry season. During the second monitoring period, two sampling events per year are required (one sample during the wet season and one sample during the dry season), except for Toxicity, which only needs to be sampled once per year during the dry season.

1. Sampling

   Regional Board staff has estimated sampling costs at 8 person/hours per sampling event, and $75 per person/hour. Therefore, the estimated cost per sampling event is $600. The total annual sampling cost for four required sampling events is $2,400. The total annual sampling cost for two required sampling events is $1,200. Based on the MRP required sampling frequency, the estimated total program cost for sampling per site is $7,200.

2. Analysis

   The cost estimate for analytical testing for the Conditional Waiver is based on information from commercial and academic laboratory rates for testing COCs, and the estimated testing frequency for typical Dischargers. Regional Board staff estimated the cost of analysis per sampling event at $2,400. The total annual analysis cost for four required sampling events is $9,600. The total annual analysis cost for two required sampling events is $4,800. The annualized analysis costs for the five-year MRP per sampling site are $5,760. Two commenters (City of Oxnard and Newhall Land and Farming) estimated annual analysis costs at $5,736 and $5,780 per site, thus confirming Regional Board staff's estimate. The estimated total program cost for analysis is $28,800 per site.

Constituents of Concern to be Sampled under the MRP:

For all four Monitoring Years: (one sample during the dry season) Toxicity
First two Monitoring Years: (one sample during the first storm of the wet season, a second wet season storm sample, and 2 dry season samples) Flow, pH, temperature, DO, turbidity, TSS, chloride, ammonia and nitrate-nitrogen and N, chlordane, 4,4 DDT, 4,4 DDD, DDE, Dieldrin, Toxaphene, Chlorpyrifos, Atrazine, Diazinon, and Pyrethroids.
Final two Monitoring Years: (one sample during the wet season and one sample during the dry season) same constituents as the first two years

B. Reporting

1. Monitoring and Reporting Plan (MRP Plan)

   Regional Board staff estimates that each MRP Plan will require 80 person hours at $75 per hour. During the course of the MRP, each discharger will be required to submit one MRP Plan. Therefore, the total program cost for the MRP Plan is $6,000 per discharger.

2. Quality Assurance Program Plan (QAPP)

   Regional Board staff estimates that each QAPP will require 80 person hours at $75 per hour. During the course of the MRP, each discharger will be required to submit one QAPP. Therefore, the total program cost for the QAPP is $6,000 per discharger.

3. Annual Monitoring Report (AMR)

   Regional Board staff estimates that each AMR will require 40 person hours at $75 per hour. During the course of the MRP, each discharger will be required to submit four AMRs. Therefore, the total program cost for the Annual Monitoring Report is $12,000 per discharger.

4. Water Quality Management Plan (WQMP)

   Regional Board staff estimates that each WQMP will require 200 person hours at $75 per hour. During the course of the MRP, each discharger or discharger Group will be required to submit no more than one WQMP. However, in order to utilize adaptive management techniques, the WQMP may need to be revised annually if the AMRs continue to show exceedance of the benchmarks. Regional Board staff estimates that annual revision of a WQMP will require 40 person hours at $75 per

hour, or $3,000 per revision. Therefore, the maximum total program cost for the WQMP is $24,000 per discharger. However, this cost estimate represents an upper-bound estimate since not all dischargers will necessarily be required to submit a WQMP, nor will each WQMP necessarily need revision throughout the course of the Waiver.

III. ESTIMATED TOTAL MRP COSTS

The above estimates for the cost components of the MRP include cost items based on the number of sites (i.e. monitoring) and cost items based on the number of dischargers (i.e. reporting). The number of sites for each Individual Discharger or Discharger Group MRP is to be approved by the Executive Officer based on several factors, including the irrigated land acreage and proximity of the discharge to waters of the State, and is currently unknown.

To estimate total MRP costs staff used the concept of a "discharger-site" with the assumption that each Individual or Group discharger monitors a single site. Based on this assumption, the estimated total per site cost for the Monitoring and Reporting Program is $84,000. Annualized over the duration of the five-year MRP, the per year cost estimate is $16,800.

This annualized estimate for the MRP costs is the basis for the total MRP estimate. Based on a number of 30 discharger-sites, program costs total $2,520,000, or $504,000 per year for five years. This cost estimate can be normalized per acre in order to compare the estimated per acre costs for Region 4 to the estimated per acre costs for other regions. The per acre cost estimate for the MRP in Region 4 is $9.58, or $1.92 per acre per year, for five years.

The estimated number of thirty discharger-monitoring sites was compared to the number of sites currently monitored in Region 5, the Central Valley region. The Central Valley region currently monitors approximately the same number of sites. When normalized to the total acreage of cropland in the Central Valley Region, it appears that the sampling site density represented by 30 sites in the Los Angeles Region is approximately 20-times denser than that of the Central Valley Region. However, the Los Angeles Region monitoring frequency is approximately one-fourth of that of the Central Valley Region and the Los Angeles Region's COC list is less extensive than that of the Central Valley Region. Further, the ratio of impaired river miles on the State's 303(d) list to irrigated land acreage is also greater in the Los Angeles Region, thus requiring a higher sampling density in the Los Angeles Region to address listed water quality impairments.

IV. OTHER COSTS ASSOCIATED WITH THE CONDITIONAL WAIVER

A. Administrative Costs

Administrative costs associated with the Conditional Waiver that will be incurred by Dischargers are currently unknown. Typically, much of the administrative requirements associated with monitoring and reporting programs, such as data management, are included in the costs associated with the monitoring and reporting program.

For the Los Angeles Regional Board, 2 person years (PYs) per year are allocated.

B. State Fees

The proposed annual fee for waivers for discharges from agricultural land is $100 per farm plus $0.50 per acre of land. If a discharger joins a group that manages fee collection and payment, the proposed fee is $100 per group plus $0.25 per acre of land. Similar fee schedules will apply to Region 3 and Region 5. The Ambient Water Monitoring (AWM) surcharge does not apply to annual fees for waivers as specified in the California Code of Regulations, Title 23, Division 3, Chapter 9, section 2200(a)(3).

C. Water Quality Management Training Costs

The Conditional Waiver requires that both Individual Dischargers and participants in a Discharger Group complete 8 hours of water quality management training. Regional Board staff estimates the cost of this training at $150 per grower.

V. BEST MANAGEMENT PRACTICE COST ESTIMATES

The following descriptions of Best Management Practices (BMPs) serve as a basis for Regional Board staff's economic analysis, and do not constitute a recommendation or approval of specific BMPs by the Regional Board.

(a) Sediment Containment: Where pollutants may adhere to the sediment, sediment controls may be utilized. Examples are contour furrowing, vegetative strips within the crops or at the edge of the waterway, and settling basins. A more complete list is available from the Federal EQIP program.

> Costs: Conservation Cover $1000/ac*, Sediment Basin $5000/ea* or $700-$1,000,000/ea**, Tail water recovery $4500-$25,000/ea**, Filter Strip $400/ac* or $375-$12500/ac**, Mulching $600/c*, Cut bank stabilization $2500/ 1/2 mile* or $125-$12500/ea**[1]

[1] * Costs specified in the 2004 Federal EQIP program with the National Resource Conservation Service
** Costs specified in the 1998 USDA Colleagues Creek Watershed Erosion and Sediment Plan for Mug Lagoon

High Potential to Reduce Water Quality Problems: Growers and FGL express concern that turbidity and contaminated sediment may affect water quality. Some storm water controls are present, but not common. Further, growers express concern about upstream or historic sediment with pollutants entering their land or downstream waterways.

(b) Fertilizer Use: Where fertilizer or amendments are used, the BMP would be an improvement in estimating the amount of fertilizer required. Examples are leaf testing, soil testing, and changes in fertilizer application methods to maximize uptake.

Costs: Nutrient management $32/ac*, Cover crop $10-$230/ac**

Moderate Potential to Reduce Water Quality Problems: Initial results from a State Board grant study by United Water Conservation District currently on-going in the Los Angeles Region show that many growers do not apply fertilizer at a rate and at a time that can best be utilized by the crop. Specifically, the fate of excess fertilizer is not well understood. Alternately, some growers report that the high cost of fertilizer means that growers only apply the minimum amount necessary to assure an economic crop and that shared and historical information is heavily utilized to ensure accurate application amounts. University of California Cooperative Extension and NRCS provide training and information on control methodology for fertilizer application.

(c) Irrigation efficiency: Where runoff is seen or where groundwater surfaces in the vicinity of the farm, improvements in water application may result in no flow and no pollutant load leaving the property. The BMP would be a more accurate measurement of water requirements through soil and plant testing, antecedent soil moisture content testing, etc.

Costs: Improved water application $10/ac*, Controlled drainage $25/ac*, Conservation tillage $5-$10/acre**, Irrigation system $850-$3,600/ea**.

Moderate Potential to Reduce Water Quality Problems: Staff discussions with local experts indicate that over irrigation is common because of the '24 hour' rule, where purchased water will only be supplied for a fixed period of time. Further, standard irrigation practice is based on water use at certain times of day and according to historic practices. More advanced testing of plant requirements is lacking. Growers report that the expense of water ensures good irrigation practices and water-saving efforts. As an example, conservation practices such as mini sprinklers are widely used. University of California Cooperative Extension and National Resources Conservation Services advisors report that extensive information is available on improving irrigation practices and that responsible use varies greatly among water users. Recent TMDL studies on the Santa Clara River confirm this report finding that growers did not know their leaching fractions but were aware of the value of that information.

(d) Pesticide handling: Where a tested pesticide is in use, the operator may provide greater controls on the storage, transport, and cleanup of the process.

Costs: Greater care and documentation with existing facilities

Low Potential to Reduce Water Quality Problems: Growers and FGL estimate that the requirements for pesticide handling and reporting have been successful in eliminating water pollution from this source.

(e) Pesticide application change: Where a tested pesticide is applied, the grower could change the application process, extent or timing relative to rain or irrigation.

Costs: Replacement pesticide or process change are assumed to have similar costs

Low Potential to Reduce Water Quality Problems: Growers and FGL estimate that the requirements for pesticide application changes have been successful in eliminating water pollution from this source.

Uncertainties about both the current extent of BMP implementation and the extent of BMP implementation that will be required to address water quality impairments limit the accuracy of Regional Board staff's cost estimate. The total annual cost estimated below is based on staff's current knowledge and judgement of the extent of BMPs that may be required by the Conditional Waiver program.

The Regional Board Staff finds that implementation of the above management practices may result in increased sampling, monitoring and reporting costs if additional sampling is required to evaluate the effectiveness of the management practice. Also, maintenance costs may be associated with some management practices, such as removing accumulated sediment from newly established sediment basins. The Staff finds that quantifying any increase in sampling, monitoring, reporting, or maintenance costs due to management practice implementation involves too many assumptions, and therefore the Regional Board Staff is unable to provide a range or magnitude of possible costs. It is possible that net costs may decrease as a result of successful management practice implementation.

VI. TOTAL ANNUAL COSTS

The total annual costs were developed using an estimate of the costs associated with the activities that must be accomplished within each year of the 5-year waiver program. Monitoring, reporting and management practice implementation costs are added as they occur. For this analysis, staff assumes that 30 discharger-sites will be sampled, and that 50 areas will require improved BMPs to reduce pollutant loadings to waters of the State. Also, costs are not estimated for low-risk sites or for groups with no water quality impacts, all of which would have lower costs. The cost of preparing a WQMP is calculated as a second year cost, and the cost of revising that WQMP is added for the last three years of the Waiver.

(a) First Year

MRP Plan 80 hours @ $75/hr times 30 sites divided by 4000 growers for $45/grower

QAPP 80 hours @ $75/hr times 30 sites divided by 4000 growers for $45/grower

WQM Training 8 hours @ $150/grower

Costs/grower $240.00

(a) Second Year

Sampling 30 sites @ $2,400 divided by 4000 growers for $18/grower

Analysis 30 sites @ $9,600 divided by 4000 growers for $72/grower

AMR 40 hours @ $75/hr times 30 sites divided by 4000 growers for $22.50/grower

WQMP 200 hours @ $75/hr times 30 sites divided by 4000 growers for $112.50/grower

State fees Group fees: $3,000 ($100 times 30 sites) plus $65,750 (263,000 acres x $.25) divided by 4000 growers for $17.19/grower

BMPs

(1) pesticide or fertilizers detected- refine application method at no cost

(2) sediment transported pollutants detected-refine irrigation practices to reduce runoff at no cost

Costs/grower $242.19

(d) Third Year:

Sampling 30 sites @ $2,400 divided by 4000 growers for $18/grower

Analysis 30 sites @ $9,600 divided by 4000 growers for $72/grower

AMR 40 hours @ $75/hr times 30 sites divided by 4000 growers for $22.50/grower

WQMP revision 40 hours @ $75/hr times 30 sites divided by 4000 growers for $22.50/grower

State fees Group fees: $3,000 ($100 times 30 sites) plus $65,750 (263,000 acres x $.25) divided by 4000 growers for $17.19/grower

BMPs

(1)Sediment control: Cover crop $10-230/ac*

50 areas @ 500 acres x $10/ acre divided by 4000 growers for $62.50/grower

(2)Fertilizer control: Nutrient management $32/ac*

50 areas @ 1000 acres x $32/acre divided by 4000 for $400/grower

(3)Pesticide/irrigation management: Improved water application $10/ac*, Controlled drainage $25/ac*

50 areas @ 1000 acres x $35/acre divided by 4000 growers for $437.50/grower

Costs/grower $152.19 and $900.00 for management practices

(f) Fourth Year:

Sampling 30 sites @ $1,200 divided by 4000 growers for $9/grower

Analysis 30 sites @ $4,800 divided by 4000 growers for $36/grower

AMR 40 hours @ $75/hr times 30 sites divided by 4000 growers for $22.50/grower

WQMP revision 40 hours @ $75/hr times 30 sites divided by 4000 growers for $22.50/grower

State fees Group fees: $3,000 ($100 times 30 sites) plus $65,750 (263,000 acres x $.25) divided by 4000 growers for $17.19/grower

BMPs

(1) Additional measures for Sediment control: Sediment Basin $5000/ea* Cut bank stabilization $2500/ 1/2 mile*

50 areas @ $5000 (1 sediment basin each) and 50 miles of bank stabilization @ $5000/mile divided by 4000 growers for $125/grower.

(2) Additional measures for Fertilizer control: Tail water recovery $4500-$25,000/ea**

$80,000 divided by 4000 growers for $20/grower.

(3) Additional measures for irrigation management: Irrigation system $850-$3,600/ea**

$80,000 divided by 4000 growers for $20/grower.

Costs/grower **$107.19 and $165.00 for management practices**

(h) Fifth year:

Sampling 30 sites @ $1,200 divided by 4000 growers for $9/grower

Analysis 30 sites @ $4,800 divided by 4000 growers for $36/grower

AMR 40 hours @ $75/hr times 30 sites divided by 4000 growers for $22.50/grower

WQMP revision 40 hours @ $75/hr times 30 sites divided by 4000 growers for $22.50/grower

State fees Group fees: $3,000 ($100 times 30 sites) plus $65,750 (263,000 acres x $.25) divided by 4000 growers for $17.19/grower

BMPs

(1) Additional measures for Sediment control: Sediment Basin $5000/ea* Cut bank stabilization $2500/ 1/2 mile*

50 areas @ $5000 (1 sediment basin each) and 50 miles of bank stabilization @ $5000/mile divided by 4000 growers for $125/grower.

(2) Additional measures for Fertilizer control: Tail water recovery $4500-$25,000/ea**

$80,000 divided by 4000 growers for $20/grower.

Additional measures for irrigation management: Irrigation system $850-$3,600/ea**

$80,000 divided by 4000 growers for $20/grower.

Costs/grower **$107.19 and $165.00 for management practices**

VII. TOTAL COSTS

An estimate of the costs associated with the Conditional Waiver for Discharges from Irrigated Lands, including monitoring and reporting costs, management practice installation costs, and state fees is described below and is based on the calculations in the previous section.

Summary of Costs by Year	**Cost for Each Grower**
First year	$240.00
Second year	$242.19
Third Year	$152.19 and $900.00 for BMPs
Fourth year	$107.19 and $165.00 for BMPs
Fifth year	$107.19 and $165.00 for BMPs
Total program cost per grower	$848.76 and $1,230.00 for BMPs

If all growers form into groups and if 30 sampling sites are established, the average annual cost for analysis of sampling results is $0.66 per acre. The average annual cost for all components of the MRP is estimated at $1.92 per acre. The additional costs where water quality problems are identified and management changes are required may add an average annual cost of $246 per grower. However, this estimate of BMP costs may vary greatly by grower, depending on how the discharger groups organize and how they choose to distribute the costs of BMPs. If individual growers are responsible for the costs of BMPs, then the costs incurred by an individual grower with severe water quality problems may be very high. Likewise, an individual with no water quality problems would not incur any BMP costs. The average annual estimate of $246 per grower for

BMPs is based on the assumption that the costs of BMP implementation are distributed evenly amongst the 4000 growers. The estimate does not include grant monies which are available to fund management implementation.

VIII. COST OFFSETS FOR CONDITIONAL WAIVER

Discharger Groups may reduce costs by acquiring funding from other sources. Agriculture water quality grants are available for projects that reduce or eliminate Nonpoint Source (NPS) pollution from agricultural lands discharged to surface water. The Los Angeles Region will also receive at least $4 million from the Agriculture Water Quality Grants Program (AWQGP), which provides funding for both monitoring and implementation projects. For more details on the AWQGP please go to the following web site: http://www.waterboards.ca.gov/funding/awqgp/index.html.

In addition to grant opportunities and other funding opportunities, it is likely that the implementation of Best Management Practices will yield significant benefits to the agricultural community. Erosion control measures and improved irrigation practices may reduce soil loss from agricultural lands. Topsoil retention is a significant benefit, allowing for lower levels of soil amendment and fertilization, thus lowering overall costs Also, improved irrigation practices may reduce water costs. The planting of filter strips can attract beneficial insects and can eventually reduce pesticide use, thus further reducing overall costs. Although the Regional Board Staff is unable to quantify the total benefits expected from the implementation of Best Management Practices, it is very likely that benefits will accrue and that these benefits will help to offset the costs imposed by the Conditional Waiver.

IX. COMPARISON OF COSTS TO OTHER REGIONS

The program costs for typical Group Dischargers in Regions 3 and 5 were also calculated based on monitoring costs alone for a five-year Conditional Waiver. The annual costs for analysis per sampling site per year are $8,920 for Region 3 and $15,889 for Region 5 (Figure 1). The estimated cost per acre per year was based on the estimated number of monitoring sites in each Region, which may explain the disparities between regions. For the Los Angeles Region, the actual number of monitoring sites is based on the Notice of Intent (NOI) proposed by the Discharger, and the Notice of Applicability issued by the Executive Officer. For Region 3, the estimated number of sampling sites is 30, which may be sufficient to ensure that the full range of discharge characteristics have been properly measured and documented. For approximately 263,000 acres of cropland and an estimated 30 sampling sites, the acreage per sampling site is 8767 acres. The average annual cost for analysis of sampling results is $0.66/acre for a typical Discharger. Figure 2 shows the comparison between the estimated cost for R4 and R5 per acre per year.

The University of California Extension estimates the net return on crops throughout California, which they publish along with a description of the best management practices for that crop. The net return above cost per acre for several crops and areas are summarized below, along with the comparison of the costs of Region 3's Conditional

Waiver program to the net return. The Conditional Waiver costs represent a small percentage of the value of the crops in Region 3. Region 4 Conditional Waiver costs are both reasonable and comparable to those of Region 3.

Crops by area	Annual net return per acre (UC COOP 2004)	Percentage annual program cost of net return per acre without BMPs
Ventura strawberry	**$4256**	**<1%**
San Joaquin strawberry	**$1993**	**<1%**
Ventura avocado	**$1960**	**<1%**
San Diego avocado	**$67**	**6%**

Figure 1: Analysis Cost per Site per Year for Regions 3,4, and 5

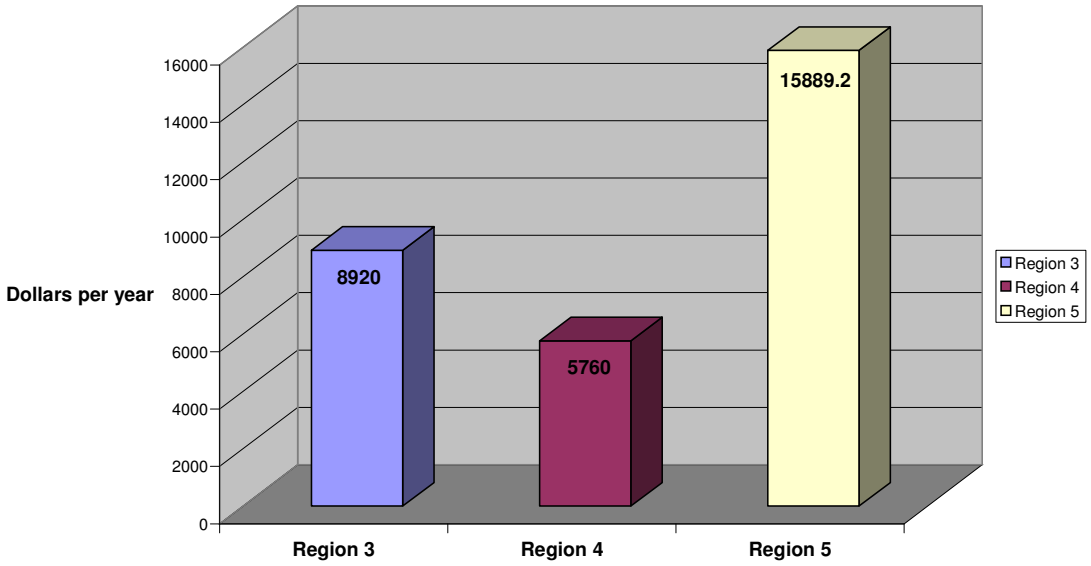

Figure 2: Analysis Cost per Acre per Year for Regions 3,4, and 5